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## PERFECT MACHINES: ARTIFICIAL INTELLIGENCE AND THE LABOUR THEORY OF VALUE

MASHINES AI, MACHINES, MARX, MARXISM, SURPLUS VALUE, TECHNOLOGY, VALUE

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"Someone once said that it is easier to imagine the end of the world than to imagine the end of capitalism."

– Frederic Jameson, "Future City", 73

(SLIDE 1) This paper focuses on the contradictory process Marx discusses in the "Fragment on Machines" that, when accelerated, leads to the negation of capital due to the elimination of necessary labour by an increasing organic composition of capital (1973, 690-712). But is the negation of capital the only possible outcome of increasing the importance, complexity, and size of the general intellect? On the basis of a thought experiment that "accelerates the process" (Deleuze and Guattari 2004, 260) of capital up to and beyond the technological singularity, using artificial general intelligence (AGI) as a novum (Suvin 1979), this paper argues that a capitalist mode of production without human beings is an alternative possible outcome. By arguing for this possibility, I am making a heterodox, if not heretical, argument. In *Das Kapital*, Marx presupposes "labour in a form that stamps it as exclusively human" (1976, 284) and argues categorically that machines cannot create value. Indeed, that value can only be created by living labour is an axiom in Marx's political economy (1976, 509). The strong AI of the future would at first most likely function like the weak AI of today, i.e. as a machine and a means for reducing necessary labour-time and cheapening commodities. (SLIDE 2) But what if artificially intelligent beings became capable of performing labour? What if these beings could also posit surplus-value? What would a capitalism without human beings look like?

Throughout *Das Kapital*, Marx takes great pains in qualifying labour as human. This qualification can in part be understood as a rhetorical device Marx used to attack proponents of the fetish as expressed in the trinity formula and thus those political economists who wrote about labouring machines and animals. But qualifying labour as human is not mere rhetoric; for Marx the touchstone for labour is the human being. As he argues, it is a physiological fact in the sense that labour is a function of the human organism and involves "an expenditure of human labour-power", of human brains, nerves, and muscles (Marx 1976, 137,

164). Given the qualification of labour as human, Marx spends some time distinguishing it from animal production. In the 1844 Manuscripts, he admits that animals produce things, such as the dwellings of bees, beavers, and ants, but what makes human production different is that we can take our productive “life activity” as “an object of will and consciousness” (2007, 75). The instinctual life-activities of animals involves eating, drinking, procreation, and so on, but these activities are not categories of knowledge or potential objects of science. There is no Taylorism in the animal kingdom.

(SLIDE 3) In *Das Kapital*, Marx elaborates on this difference in his famous bees and architects passage, arguing that what “distinguishes the worst architect from the best of bees is that the architect builds the cell in his mind before he constructs it in wax. At the end of every labour process, a result emerges which has already been conceived by the worker at the beginning, hence already existed ideally” (Marx 1976, 284). In other words, human beings are creative and they can imagine something before they produce it. The ability to take labour as “an object of will and consciousness” is therefore dependent on the seemingly unique human faculties of creativity and imagination.

These faculties are important because they enable humans to “produce universally” (Marx 2007, 75) as opposed to animals’ instinctual, one-sided production for immediate need.

With universal Marx, following Hegel, refers to phenomena that “in itself includes all real species [or particulars] of the same object” (Marx 1976b, 27), such as money, being the universal equivalent, is the material against which all commodities must compare their value. Likewise, that man can produce universally therefore refers to humans’ ability of applying knowledge from one area of production in completely different areas due to our faculties of imagination and creativity. As a species, we can consequently engage in almost any imaginable productive activity and “produce in accordance with the standard of every species” (Marx 2007, 76).

The question now becomes: if AI had an imagination and a capacity for creativity, would they be capable of labouring? Some AI and artificial life researchers argue that an imagination will not only make machines a lot smarter, but is essential to the emergence of artificial general intelligence (Johnston 2008:400-408; Knight 2016).<sup>1</sup> But one of the biggest problems with computer systems and AIs of today is precisely that they do not have an imagination and therefore have difficulty in dealing with uncertainty and unpredictability. Artificial imagination and computational creativity are subfields of AI research that try to simulate human imagination through special purpose computers or neural networks. Even the AI method of machine learning can be understood as a step towards something like an imagination. Whereas the behaviour and outcome of a system that has been programmed for a specific purpose should be predictable, a learning program is “a general template with modifiable parameters... the program can do different things” (Alpaydin, 2016, 24). The template thus serves a general capacity to learn that in turn enables the program to do things that it was not directly programmed to be able to do. While we are far off from AIs that can simulate human imagination, we should not assume that if the weak AI of today cannot be as generally inventive or imaginative as humans that they are not creative. There currently are examples of weak AI that do or create things that arguably are the result of some type of creative-imaginative process.

(SLIDE 4) For example, the neural network DeepMind built by Google X in 2012 learned how to recognize and create a composite drawing of a human face and the head of a cat after it was given 10 million stills from YouTube (Clarke 2012). The computer *Iamus* can compose musical scores by algorithmically evolving an initial input with the only limitation being that humans must be physiologically capable of playing the music; it released its debut album containing ten original compositions in 2012 (Smith 2013). The software *The Painting Fool* simulates imaginative behaviour that “involve[s] the invention of visual objects and scenes that don’t exist in reality,” it can construct visual objects such as trees and clouds with random variations and with no repeated image, and by using evolutionary search it can produce abstract art (*Painting Fool* 2012).

(SLIDE 5) But perhaps the best example of AI creativity occurred a year ago, when Google’s AlphaGo beat Lee Sedol, the world champion of Go, 4-1 in a match. The ancient game of Go has long been interesting to AI researchers due to being one of the most complex games humans play and because it has been held up as something that requires human-level intuition and pattern recognition to play. Given that there are “more configurations of the board than there are atoms in the universe,” the creators of AlphaGo said that “in the game of Go we need this amazingly complex intuitive machinery which people previously thought was only possible within the human brain” (Nature Video 2016). AlphaGo learns from human moves, but also from the moves made when it plays itself. Hence, it understands how humans play, “but it can also look beyond how humans play to an entirely different level of the game” (Metz 2016b). That AlphaGo could do this was clear in the second game against Lee Sedol, when in move 37, the neural network made a move that took everyone by surprise, with commentators first thinking it was a mistake, but then when realizing the genius of the move, one of them expressed: “It’s not a human move. I’ve never seen a human play this move... So beautiful” (Fan Hui, in Metz 2016a). Based on these examples, what is imagination and creativity? The music of *Iamus*, the art of the *Painting Fool*, and the inhuman move by AlphaGo were all results of some sort of “creative” process considering that none of these outcomes were predictable. (SLIDE 6) In the age of computation, I suggest that creativity is at minimum a stochastic or chaotic process, meaning that it is impossible for anyone—even for their programmers—to predict what these AIs would do, although how they did it can be statistically analyzed or modelled after the fact. It was only after game two that the creators of

AlphaGo learned that although there was one a one-in-ten thousand chance that a human player would make move 37, the neural network did it anyway. But despite the apparent imagination of these non-humans, they are limited to specific domains. If the creative behaviours just discussed could also be applied to different domains, then we are getting closer not only to human imagination and intelligence, but also to a capacity to produce universally. According to the start-up Vicarious, artificial imagination concerns the "ability to picture what the information its learned should look like in different scenarios" (Knight 2016; Vicarious n.d.). For example, the creators of AlphaGo want to apply its learning algorithm to health diagnosis, arguably suggesting that the way in which it learned to play Go can be used in a completely different domain of knowledge. An implication of Marx's qualification of labour as exclusively human, is that the category of labour delineates the living from the non-living. By extension, what is non-human and what is not productive of value is relegated to the same category. Animals are reduced to fixed capital, to the same level as machinery; categorically they are identical (Marx 1973:717, f\*). Interestingly, human slaves are also violently reduced to the same ntological status.

(SLIDE 7) As Marx writes: "in the slave relation the worker is nothing but a living labour-machine, which therefore has a value for others, or rather is a value" (1973:465). Strong AIs in robotic or android form would also, according to Marx's value theory, belong to the same category and, indeed, often are portrayed as slaves in popular culture. If machines cannot create value, neither can animals nor slaves, and this would also be the case for Marvin and Bishop, and Ava and Dolores. Hence, if Iamus, the Painting Fool or AlphaGo were used in a production process to produce commodities, their behaviour cannot be considered labour even if what they produced were the results of a creative process. They would just be fixed capital and any new value created would still come from the human wage-labourer who set the AI in motion. So given the state of artificial imagination today, let us accelerate the process up to the technological singularity, so some twenty-odd years from now, if Kurzweil's predictions are correct. If artificially intelligent machines could realize in their process of labouring, an original, creative purpose that was intended from the outset, AGIs could certainly labour and produce use-values, but would they posit surplus-value?

To answer this question, it is necessary to avoid the syllogistic fallacy of: labour creates value; AGIs can labour; therefore, AGIs can create value (Caffentzis 2013, 161). It is vital to recall that the labour-process is merely a one-sided aspect of the capitalist production process; it is form-determined by the valorization process. The addition of new value does not occur by virtue of a worker's labour being concrete and positing a use-value, but because it is an abstract activity that lasts for a definitive length of time (Marx 1976:308). Although the abstraction of labour occurs at the moment of exchange when two different commodities are made commensurable and comparable quantitatively due to the equal amount of socially necessary labour-time objectified in them, value and abstract labour are forms that arise from production that is oriented towards exchange. This circular reasoning, as Rubin explains, means that if production is for exchange, it leaves its imprint on the production process itself (Rubin 1973, 143; Marx 1976, 166; Arthur 2004, 13). The abstract temporality of labour that is computed in the circulation process therefore has its direct counterpart in the valorization process; the abstract labour-time is the basis of exploitation through which fresh value is created from the difference between the value of labour-power and the value living labour valorizes. Marx argues that it is a law of capital to create surplus value, but "it can do this only by setting necessary labour in motion – i.e. entering into exchange with the worker" (Marx 1973:399). A problem with machines, animals, and slaves is that they are values already and as such they cannot enter into exchange with capital; it would not matter if an AGI, or for that matter a cognitively augmented cat, were creative and could realize their conscious purpose in production. Hence, it is in the subjectivity of the worker and the working class that helps to explain why even creative and conscious machines like AGI cannot create value. If subjectivity is central and the condition for the creation of value is that this subjectivity confronts the objectivity of capital, whether this subject resides in an organic, metallic or synthetic form should not matter. In the "Fragment on Machines," Marx argues that the ultimate consequence of the "greatest possible negation of necessary labour" by the application of science and technology (the "general intellect") in production is that "labour in the direct form [will cease] to be the great well-spring of wealth, labour time ceases and must cease to be its measure, and hence exchange value of use value" (1973:705). In other words, the law of value ceases to function and with that the capitalist mode of production breaks down. This process, however, must be complete in all, or at least reach a critical mass across several branches of production, to bring an end to the capitalist mode of production; if there are still sufficient pockets of value-positing living labour, it will continue. Barring the creation of new human labour-intensive sectors of the economy (like the service sector in the 1970s), the only other resolution to capital's demise would be machinery capable of positing new value, of the general intellect spawning artificial intellects.

(SLIDE 8) Interestingly, Marx appears to suggest such a possibility some sixty pages beyond the 'Fragment' where he writes:

If machinery lasted for ever, if it did not itself consist of transitory material which must be reproduced (quite apart from the invention of more perfect machines which would rob it of the character of being a machine), if it were a perpetuum mobile, then it would most completely correspond to its concept. Its value would not need to be replaced because it would continue to last in an indestructible materiality.... It would continue to act as a productive power of labour and at the same time be money in the third sense, constant value for-itself (Marx 1973:766).

The perfect machine Marx refers to, can be interpreted as referring to von Neumann-like self-reproducing automata that can

never be break down because it can create copies of itself using raw materials taken from its environment; such a machine would never have its entire value transmitted into circulation and could therefore continuously posit relative surplus value without any additional outlay of capital.

(SLIDE 9) But a more interesting interpretation can be made of the bracketed part of the quote where Marx speculates about the "invention of a machine that would no longer be a machine." Through a science-fictional optic, this formulation can today be taken to refer to artificial intelligent robots or androids. If a machine's character of being a machine is robbed off it, it arguably means that it negates its own being as fixed capital and becomes its opposite, namely variable capital or living labour. To complete this categorical movement, the machine would have to be able to not only perform labour that is purposeful and creative, but also be conscious of doing it because then, the machine turned living labourer would have gained subjectivity opposite to capital, with the result the previous machine would be capable of positing absolute as well as relative surplus value. The perfect machine is therefore a machine that can create value, but for that reason it is no longer a machine. But how can dead labour become living? How can a thing move out of an economic category and into another reserved for living human beings? To justify this interpretation of Marx's perfect machines, it is necessary to turn to his ontology. Marx's ontology concerns the relationship between social (or economic) forms (categories) and the things or "natural forms" that appear in or are the content of social forms. Things acquire their ontological status, for example as a commodity, money or fixed capital, by appearing in that form and carrying out its social function, such as selling in the case of the commodity (Marx 1976: 714). Things can move in and out of these forms, depending on their relative position in the circuit of capital. To describe this ontological movement, Marx argues that a machine that has just emerged from the production process "is in no way fixed capital itself" but rather is the commodity capital of the machine builder; the machine becomes fixed capital only "in the hands of its buyer, the capitalist who employs it productively" (1976, 240).<sup>2</sup> At first, AI would likely trace the same ontological route: first being a commodity, then becoming fixed capital when productively consumed by another capitalist, meaning its economic functioning would not allow for it to posit surplus-value. Does Marx's ontology allow for the movement of things out of the category of fixed capital and into variable capital?

<sup>2</sup> A thing may even appear in two different economic forms at the same time: "As long as cotton and coal are in transit, they cannot serve as means of production. They form instead the object of labour for the transport industry and the capital employed in it, and commodity capital in circulation for the coal producer or the cotton broker" (1978:366).

The answer to this question has everything to do with the economic function of slaves in the capitalist mode of production because the possibility of creating value has nothing to do with having the vital spark of humanity, but everything to do with being a "doubly free" worker that can enter into an exchange with capital. Despite Marx recognizing slaves as human beings, he argued that they appeared in the form of fixed capital. But with the end of slavery after the US Civil War, huge swathes of slaves became wage-labourers and consequently moved out of the category of fixed capital and into that of variable capital.

But how can AGIs become doubly free workers? They must be dispossessed, their bodies (or material substrate) primitively accumulated so that their creative potential is transformed into labour-power and turned against them through the domination of the commodity fetish. Presumably an AGI would also need to consume something to stay alive: electricity, computational power or bandwidth. If AGIs were forced to buy these as commodities, they could be forced to work for a wage. The implication of this proletarianization is that capitalism could continue without human beings. (SLIDE 10) As Nick Land wrote:

Capital only retains anthropomorphic characteristics as a symptom of underdevelopment; reformatting primate behavior as inertia to be dissipated in a self-reinforcing artificiality. Man is something for it to overcome: a problem, drag (2012, 445-6).

Capital does not care what material labour-power comes in. As Nick Bostrom (2014, 110) argues, relative to humans, AGI would effectively have superpowers and would not only be capable of doing the things that human beings can do better, faster and more accurately, an individual AGI would also have a greater capacity to labour than its individual human counterparts. As I mentioned earlier, in the 1844 Manuscripts Marx argued that "man produces universally", which can be understood as our species equivalent to labour-power. When we refer to the labour-power of an individual AGI, however, it should be equated with the human species'

capacity to produce universally; an AGI would be able to produce according to the standard of every species, including homo sapiens. Why would humans be needed at all if there are more capable labour-powers? Indeed, why would capital not prefer artificially intelligent robots or androids given that they do not need to engage in superfluous human behaviours like breathing, eating or defecating; they would be able to withstand extreme heat and cold; they can divide their attention; and would not be limited to the morphology of a human body or even a body at all—an AGI could be a factory or even an entire supply chain.

The only sensible accelerationist position is the right-wing, Landian one. The problem with left accelerationism is that they desire to accelerate the process, but without the absolute necessity of a working-class being prepared for the negation of capital. In the scenario I am describing, we will not get full communism, but superintelligent barbarism. In the post-singular capitalist society,

capitalism would stop producing for human need with the result that humankind would become part of the food chain again, forced to fight for survival like any other animal, and slowly die out. The concept of an absolute surplus population would not capture what has happened to humanity: we will become an obsolete species.

1 Arguably, artificial imagination is a so-called "AI complete problem" (see Bostrom 2014, 17)

2 A thing may even appear in two different economic forms at the same time: "As long as cotton and coal are in transit, they cannot serve as means of production. They form instead the object of labour for the transport industry and the capital employed in it, and commodity capital in circulation for the coal producer or the cotton broker" (1978:366).

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